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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: James William Kortovich  
Serial No.: 10/649,359  
Filed: August 27, 2003  
For: Process Of Making Graphite Articles  
Group Art Unit: 1732  
Attorney's Docket No. P2022-2/N9719  
Customer No. 23456

**DECLARATION OF IRWIN C. LEWIS**

I, Irwin C. Lewis, Ph.D., declare and state as follows:

1. I am a named inventor on the above-captioned application.
2. I received my Ph.D. in Organic Chemistry at the University of Kansas in 1957 and performed post-doctoral research at Penn State University.
3. I joined the Research & Development Group of UCAR Carbon Company Inc. (UCAR) in 1960, and was a member of the Research Group and a Senior Corporate Fellow at UCAR's Research & Development Center in Parma, Ohio, for more than 42 years. I retired in 2003, but I still consult for UCAR on a regular basis.

**BEST AVAILABLE COPY**

4. I am an expert in Carbon Chemistry and the characterization of raw materials, both coke and pitch. I performed key research in the development of pitch-based carbon fiber and was the principal investigator for U.S. government programs researching the use of active carbon as a storage medium for natural gas and the use of carbon anode materials for lithium/carbon batteries. My areas of expertise also include resins as binders and impregnants, additives to pitch, and mesophase development during carbonization.

5. I have authored over 100 publications and I am a named inventor on more than 35 U.S. Patents (lists of publications and patents attached). I have been an invited lecturer at a number of International Carbon Conferences and was awarded both the Graffin Lectureship and the Petinos Award from the American Carbon Society. In 1992, I received an International Award from the Ishikawa Society in Japan.

6. I have reviewed the patent to Singer et al., U.S. 4,891,203, cited during prosecution of the above-captioned application, and have concluded that the invention disclosed in the cited patent is substantially different from the claims of the current application and would not be construed by workers skilled in the art as suggesting the claimed invention of the current application, especially claim 15, and those claims depending from claim 15.

7. More specifically, the above-captioned application is directed towards utilizing mixtures of calcined coke with a controlled particle size of 0.25- 25 mm and a coal tar pitch binder to produce graphite articles. The graphite articles prepared from this combination have the advantages of lower longitudinal coefficient of expansion and higher flexural strength without any increase in specific electrical resistance or transverse coefficient of expansion as compared to conventionally produced graphite articles.

8. The cited Singer et al. patent uses flake-like semi-coke formed by mechanical deformation of a mesophase pitch which has been advanced to give a deformation temperature as measured by thermo mechanical analysis (TMA) of at least 400°C. Semi-coke is a highly viscous mesophase that has not yet advanced to infusible coke. The semi-coke flakes of Singer et al. are coke precursors having seen final temperatures of about 500°C and would have a plate-like biaxial orientation. The calcined coke filler used in the claimed invention is far removed from semi-coke, having been processed to final temperatures of about 1400°C.

9. The examples in the Singer et al. patent further confirm my conclusion of its lack of relevance to the current application. For instance, in example 3, Singer et al. describe producing a graphite article from a blend of semi-coke

particles of two different sizes 0.84 and 1.68 mm and comparing it to that of an article made similarly from conventional calcined coke. The purpose is to show the benefit in reduction in longitudinal CTE for the semi-coke as compared to conventional coke, not to demonstrate any advantage for the mixture in particle sizes. In fact, the properties of the graphite from the Singer et al. example show a substantial increase in electrical resistivity for the semi-coke graphite, which would be a distinct disadvantage for use as a graphite electrode. There is also no evidence for any increase in flexural strength indicated from the data in the Singer et al. reference. Indeed, there is a significant reduction in bulk density for the graphite produced by Singer et al., which would be expected to lead to a reduction in flexural strength.

10. Indeed, it is appreciated in the art that semi-coke is inappropriate for use as a filler in the production of graphite bodies like graphite electrodes. The physical characteristics of semi-coke would result in deformation and extensive outgassing during the carbonization process. The resulting article would have poor structure and insufficient binding.

11. Thus, regardless of the particle sizes discussed in the Singer et al. patent, there can be no suggestion to use semi-coke as a filler in the production of graphite electrodes, since doing so would be recognized in the art as producing an inferior and virtually unusable graphite electrode.

12. In summary, it is my belief that the technical aspects of the Singer et al. patent have no relevance to the current application and would not provide any obvious direction to our claims for the use of controlled particle sized calcined coke filler. The use of calcined coke filler of the claimed size ranges, in the claimed proportions, leads to a graphite article, especially a graphite electrode, exhibiting increased flexural strength and decreased brittleness.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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11/19/04  
Date

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Author LEWIS, IRWIN C. ("")  
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Author LEWIS, IRWIN  
Author SANTANA, MARK ("")  
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Author LEWIS, IRWIN C.  
Author LEWIS, RICHARD T.  
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Author LEWIS, IRWIN C. ("")  
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Author STILLER, A.W. ("")  
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Author LEWIS, R.T. ("")  
Author MAYER, H.K. ("")  
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Author STRONG, S.L. ("")  
Author BALL, D.R. ("")  
Author MULHAUPT, T.C. (UCC. LINDE DIVISION)  
Author MCMAHON, K.C. ("")  
Author BEVIER, W.E. ("")  
Title NEW ACTIVE CARBONS FOR NATURAL GAS STORAGE

Author LEWIS, I.C. (UCAR CARBON)  
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Author DICKINSON, E.M. ("")  
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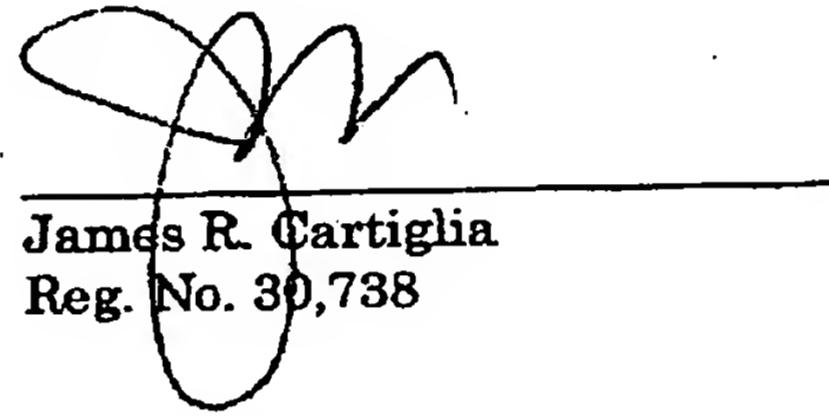
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I hereby certify that this Response to Office Action (11 pages), including Certificate of Facsimile transmittal (1 page), Declaration of Irwin C. Lewis, with attachments (19 pages), and facsimile cover page (1 page) are being sent via facsimile to the Commissioner for Patents at (703) 872-9306 on November 29, 2004.

  
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